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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/578,228	05/24/2000	Robert L. Heimann	EI.017RH-2	4626

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09/04/2003

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EXAMINER

MULLINS, BURTON S

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 09/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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NOTIFICATION OF REQUESTED NEW FORMAT FOR AMENDMENTS AND/OR RESPONSES FILED IN ART UNITS 1634, 2827, AND 2834

The United States Patent and Trademark Office (USPTO) is currently conducting a prototype of electronic application processing and examination in **Art Units 1634, 2827, and 2834**. To facilitate the prototype, the following changes in format for Amendments and/or Responses filed in those Art Units are requested.

Requested Format of Amendments and Responses during the prototype.

Each section of an Amendment and/or Response (e.g., Claim Amendments, Specification Amendments, Remarks) should begin on a separate sheet to facilitate separate indexing and scanning of the document. *For example*, in an Amendment containing a.) introductory comments, b.) amendments to the claims, c.) amendments to the specification, and d.) remarks, each of these sections should begin on a separate sheet. **For each amendment filed in Art Units 1634, 2827, and 2834, the requirement to provide two sets of claims (a clean version and a marked up version), as set forth in 37 CFR 1.121(c), will be waived where the following format is employed.**

Each amendment that includes a change to an existing claim, or submission of a new claim shall be made by submitting a **summary document with the status of all claims and the text of all pending claims as follows:**

- (1) The status of all of the claims in the application, including any previously canceled or withdrawn claims, must be summarized in each amendment document. Status is indicated by a parenthetical expression following the claim number (e.g. (original), (currently amended), (previously amended), (canceled), (withdrawn), or (new)). The text of all pending claims must be submitted each time any claim is amended. Canceled and withdrawn claims may be indicated by only the claim number and status.
- (2) All claims being currently amended must be submitted with markings to indicate the changes that have been made. The changes in any amended claim may be shown by strikethrough (for deleted matter) or underlining (for added matter), or by any equivalent marking system.
- (3) The text of pending claims not being amended must be presented in each amendment document in clean version, i.e., without any markings. Any claim presented in clean version will constitute an assertion that it has not been changed relative to the immediate prior version.
- (4) A claim may be canceled by merely providing an instruction to cancel. Any claims added by amendment must be indicated as (new).
- (5) All of the claims in each amendment paper must be presented in ascending numerical order. Consecutive canceled or withdrawn claims may be aggregated into one statement (e.g. Claims 1 – 5 (canceled)).

Amendments to the specification are performed in the conventional manner (37 CFR 1.121(b)).

Patent Copies

Additionally, applicants and practitioners will no longer be required to provide copies of U.S. Patents and Published U.S. Patent Applications cited in any Information Disclosure Statement (IDS) submitted to the USPTO during the prototype and in applications assigned to the three art units. It is requested that eIDSs be used to file all IDS papers for applications before the prototype Art Units. Similarly, during the prototype, copies of U.S. Patents and Published U.S. Patent Applications cited by an examiner during prosecution of an application will not be provided to applicants in Office actions from these Art Units. These documents are available from the USPTO web site, www.uspto.gov for free download. Cited foreign patents and published applications and non-patent literature will be mailed by conventional processing.

The above requested new format and procedures are applicable during the prototype only to applications assigned to Art Units 1634, 2827, and 2834. Any questions regarding these requirements may be directed to image.processing@uspto.gov or one of the Supervisory Patent Examiners of these Art Units 1634 – Gary.Jones@uspto.gov; 2827 – Dave.Talbott@uspto.gov or 2834 – Nestor.Ramirez@uspto.gov.

Office Action Summary

Application No.

09/578,228

Applicant(s)

HEIMANN ET AL.

Examiner

Burton S. Mullins

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. Applicant requests consideration of US Patent No. 6,455,100, including references cited therein. However, the examiner notes that an information disclosure statement complying with 37 CFR 1.98(a)(1), which requires a list of all patents, publications, or other information submitted for consideration by the Office, has not been filed. To speed prosecution, the examiner will consider the US and foreign references cited in US '100. Copies of the non-patent literature cited in US '100 are not available for consideration at this time. If applicant wishes these references to appear on the front of any patent issuing from this application, he should provide an IDS list per 37 CFR 1.98(a)(1) above.

Claim Rejections - 35 USC § 112

2. Claims 33-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 36, functional recitation "wherein the treated surface...reacts with molten aluminum" is vague. Does this refer to a general chemical reaction or a metallurgic reaction?

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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4. Claims 20-29 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy (US 5,488,984) in view of Parkinson (US 3,839,256). Fahy generally teaches a method for manufacturing squirrel-cage rotors including treating high-permeability steel core laminations 5 with a solution including sodium nitrite, and injecting molten aluminum in defined openings therein (notches 9) to produce rotor bars 15 and end rings 17 (c.3, lines 19-25; Figs.1-2). The solution prevents soldering of the aluminum to the steel (abstract). Fahy does not teach a coating "comprising at least one silicate and silica and having a basic pH."

Parkinson teaches an electrical insulation coating composition for magnetic cores comprising: a coating composition comprising at least one silica containing composition (e.g., sodium silicate, c.2, lines 50-53, Example 6) having at least one silicate and silica and having a basic pH (sodium silicate has basic pH). Among other advantages, Parkinson's coating provides good insulation characteristics and improved handling during manufacture since the coating is not acidic and corrosive (c.2, line 52-c.3, line 10).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy and provide a silicate/silica solution with basic pH per Parkinson since this would have been desirable to provide good insulation characteristics to the laminations and improve handling thereof during rotor manufacture.

Regarding claim 21, the aluminum bars 15 and end rings 17 in Fahy partially encapsulate the rotor laminations.

Regarding claims 22-24, the coating separates and electrically insulates the laminations from the molded aluminum in Fahy and Parkinson.

Regarding claim 26, Parkinson teaches polymers (c.7, lines 17-25).

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Regarding claim 28, note that Parkinson teaches that sodium silicate may be substituted (c.2, lines 50-53, Example 6).

Regarding claim 33 and the functional language “wherein the treated surface electrically insulates the component from and reacts with molten aluminum that at least partially embeds said component”, Fahy’s Nitrisol B coating inherently insulates the laminations and Parkinson teaches that the coating insulates the sheets (abstract, lines 6-7). Further, the coating of Fahy and Parkinson inherently “reacts with” the aluminum since the composition, in particular Fahy’s, prevents the aluminum from contacting or soldering to the underlying metal containing surface (c.3, lines 38-42). In Parkinson, the coating’s ethylene copolymers are described as providing “excellent adhesion to metal surfaces and...reacted or cross-linked under certain conditions” (c.2, lines 58-64). Such metal surfaces would include the embedded aluminum.

Regarding claim 34, Parkinson teaches sodium silicate (c.2, lines 50-53, Example 6).

Regarding claim 35, Parkinson and Fahy both teach insulative coatings. While they do not explicitly state that the coating provides the surface with a resistivity of greater than 1.0 milli-ohm, optimization of ranges for the resistivity would have involved ordinary skill since it has been held that where the general conditions of a claim are met, discovering optimum or workable ranges involves routine skill. In re Aller, 105 USPQ 233.

5. Claims 20-27, 29 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy (US 5,488,984) in view of Heimann (US 5,714,093). Fahy generally teaches a method for manufacturing squirrel-cage rotors including treating high-permeability steel core laminations 5 with a solution including sodium nitrite, and injecting molten aluminum therein

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to produce rotor bars 15 and end rings 17 (c.3, lines 19-25; Figs.1-2). The solution prevents soldering of the aluminum to the steel (abstract). Fahy does not teach a coating "comprising at least one silicate and silica and having a basic pH."

Heimann teaches a gel coating for inhibiting corrosion of ferrous metals comprising a base made of, among others, silicate esters (c.14, lines 48-49) and further including a thickener such as silica (c.14, line 59), or additives including silica for tailoring thermal resistance (c.15, lines 48-56). Heimann further teaches: "The gel includes buffers in sufficient quantity to enable the gel to buffer pH in the range in which the metal to be corrosion-protected is naturally passive to corrosion. For protecting steel, iron or iron alloy, a gel comprising a polyalphaolefin (1-decene) base and about 10% by volume sodium silicate, about 10% by volume potassium silicate and about 10% by volume zinc borate has been found very effective. Such a composition, when applied to the steel, iron or iron alloy surface, provides a pH buffer for the metal in the pH range between 8-13" (c.14, lines 6-15).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy and provide a silicate/silica coating with basic pH per Heimann since this would have been desirable to prevent or retard corrosion of the metal laminations.

Regarding claim 21, the aluminum bars 15 and end rings 17 in Fahy partially encapsulate the rotor laminations.

Regarding claims 22-24, as best understood, the coating separates and electrically insulates the laminations from the molded aluminum in Fahy and Heimann.

Regarding claim 26, Heimann teaches polymers (c.14, lines 16-50).

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Regarding claim 31, silica additives in Heimann (c.15, line 51) would include silicon carbide and silicon nitride.

Regarding claim 32, note acrylics and urethanes in Heimann (c.15, lines 3-15).

6. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy and either Parkinson or Heimann as applied to claim 25 above, and further in view of Takimoto et al. (US 5,298,059). Fahy and Parkinson or Heimann do not appear to teach ferromagnetic particle additives.

Takimoto teaches a silicate coating composition for rust prevention in steel plates (c.1, lines 20-24; c.5, lines 65-c.6, line 2) including ferromagnetic pigments such as iron oxides (c.4, lines 58-59).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy and either Parkinson or Heimann and provide ferromagnetic additives per Takimoto since pigments would have been desirable to impart color to the coating.

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy and Parkinson as applied to claim 25 above, and further in view of Ettinger et al. (US 4,479,104). Fahy and Parkinson do not appear teach any of the additives in claim 31, e.g., silicon carbide, carbon, etc.

However, Ettinger teaches that it is well known to employ semi-conductive particles such as powdered silicon carbide in insulating enamel coatings for transformer cores, depending upon the degree of conductivity required at the impulse voltage (c.2, lines 27-46).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy and Parkinson and provide a silicon carbide additive in the coating per Ettinger

since such a semi-conductive compound would have been desirable for providing the degree of conductivity required at the impulse voltage.

8. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy and Parkinson as applied to claim 33 above, and further in view of Takimoto et al. (US 5,298,059). Fahy and Parkinson do not appear to teach ferromagnetic particle additives.

Takimoto teaches a silicate coating composition for rust prevention in steel plates (c.1, lines 20-24; c.5, lines 65-c.6, line 2) including ferromagnetic pigments such as iron oxides (c.4, lines 58-59).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy and Parkinson and provide ferromagnetic additives per Takimoto since pigments would have been desirable to impart color to the coating.

9. Claims 20-25, 27, 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy (US 5,488,984) in view of JP Published Application 4-165082 and van Ooij et al. (US 5,108,793). Fahy teaches an electric motor rotor lamination treatment and manufacturing method including a squirrel-cage rotor assembly 1 comprising core 3 made of plural laminations 5 of high-magnetic permeability sheet steel (Figs.1-2). The core is placed in a mold and molten aluminum contacts the lamination slots 13 to form bars 15 and end rings 17.

Fahy teaches a Nitrosol B coating for the laminations which prevents rotor soldering, but does not disclose a coating for the laminations: 1) "comprising at least one silicate and silica;" and 2) "having a basic pH."

Regarding (1), JP Published Application 4-165082 (JP '082) teaches an insulating film used for iron cores of transformers obtained by contacting the hot-rolled steel transformer

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laminates with a coating composition comprising colloidal silica (up to 50 nm particle size) and further including 0.5-25 pts.wt. of 5-2000 nm size non-colloidal solid including silicate (abstract). The film is useful for giving good magnetic characteristics to the transformer cores (abstract).

Regarding (2), Van Ooij teaches a silicate coating for sheet steel to protect against corrosion (c.1, lines 6-12). The sheet is rinsed in a waterglass solution of silicate at basic pH levels (e.g., a pH of 12 in Example 1). The basic pH controls the rate of reaction for forming the silicate coating in a reasonable period of time. At a pH less than 10, the rate is too slow. At a pH greater than 12, the rate is not appreciably increased. See c.4, lines 32-43.

It would have been obvious to one having ordinary skill in the art at the time of the invention to provide Fahy's motor laminations with: 1) a coating comprising a silicate and a silica per JP '082 since this would have been desirable to give good magnetic characteristics to the core; and 2) a basic pH per van Ooij since this would have been desirable to provide a rate of reaction for forming the coating in a reasonable period of time. Regarding claims 22-24, the coating of JP '082 and van Ooij as applied to Fahy inherently performs the functions of isolating and electrically insulating the substrate from the metal molding, as well as providing a "barrier" between the substrate and the metal molding.

Regarding claim 29, the coating of JP '02 and van Ooij as applied to Fahy would be inherently electrically resistive.

Regarding claim 33 and the functional language "wherein the treated surface electrically insulates the component from and reacts with molten aluminum that at least partially embeds said component", Fahy's Nitrisol B coating inherently insulates the

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laminations and JP '082 teaches that the coating insulates the steel sheets (abstract). Further, the coating of Fahy, JP '082 and van Ooij would inherently "react with" the aluminum since the composition, in particular Fahy's, prevents the aluminum from contacting or soldering to the underlying metal containing surface (c.3, lines 38-42).

Regarding claim 35, Fahy and JP '02 teach insulative coatings. While they do not explicitly state that the coating provides the surface with a resistivity of greater than 1.0 milliohm, optimization of ranges for the resistivity would have involved ordinary skill since it has been held that where the general conditions of a claim are met, discovering optimum or workable ranges involves routine skill. In re Aller, 105 USPQ 233.

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy, JP '082 and van Ooij as applied to claim 25 above, and further in view of Miyosawa (US 4,016,129). Fahy, JP '082 and van Ooij do not teach a water-soluble polymer.

Miyosawa teaches a silica coating composition including an aqueous dispersion of silica-polyvinyl alcohol of variable viscosity for coating flexibility and continuity (c.3, lines 1-5) and a boric acid and tetraborate (c.7, lines 28-34) used as curing agents for the coating (c.5, lines 50-52).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy, JP '082 and van Ooij and provide a water-soluble polymer per Miyosawa since these compounds would have been desirable for coating flexibility and as curing agents for the coating, respectively.

11. Claims 30 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy, JP '082 and van Ooij as applied to respective claims 25 and 33 above, and further in view of

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Takimoto et al. (US 5,298,059). Fahy, JP '082 and van Ooij do not teach ferromagnetic particle additives.

Takimoto teaches a silicate coating composition for rust prevention in steel plates (c.1, lines 20-24; c.5, lines 65-c.6, line 2) including ferromagnetic pigments such as iron oxides (c.4, lines 58-59).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy, JP '082 and van Ooij and provide ferromagnetic additives per Takimoto since pigments would have been desirable to impart color to the coating.

12. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fahy, JP '082 and van Ooij as applied to claim 25 above, and further in view of Ettinger et al. (US 4,479,104). Fahy, JP '082 and van Ooij or Heimann do not teach any of the additives in claim 31, e.g., silicon carbide, carbon, etc.

However, Ettinger teaches that it is well known to employ semi-conductive particles such as powdered silicon carbide in insulating enamel coatings for transformer cores, depending upon the degree of conductivity required at the impulse voltage (c.2, lines 27-46).

It would have been obvious to one of ordinary skill at the time of the invention to modify Fahy, JP '082 and van Ooij and provide a silicon carbide additive in the coating per Ettinger since such a semi-conductive compound would have been desirable for providing the degree of conductivity required at the impulse voltage.

Response to Arguments

13. Applicant's arguments with respect to claims 20-31 have been considered but are not persuasive. In response to applicant's argument that there is no suggestion to combine Fahy and Parkinson, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Parkinson teaches a number of advantages his coating provides, including good insulation characteristics and improved handling during manufacture, since the coating is not acidic and corrosive (c.2, line 52-c.3, line 10). Both prior art references are in the field of applicant's endeavor of steel laminate coatings and thus reliance upon them as a basis for rejection of the claimed invention is proper. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

14. In response to applicant's argument that there is no suggestion to combine Fahy and Heimann, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Heimann teaches that: "The gel includes buffers in sufficient quantity to enable the gel to buffer pH in the range in which the metal to be corrosion-

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protected is naturally passive to corrosion. *For protecting steel, iron or iron alloy*, a gel comprising a polyalphaolefin (1-decene) base and about 10% by volume sodium silicate, about 10% by volume potassium silicate and about 10% by volume zinc borate has been found very effective. Such a composition, when applied to the steel, iron or iron alloy surface, provides a pH buffer for the metal in the pH range between 8-13” (c.14, lines 6-15, emphasis added).

Both prior art references are in the field of applicant’s endeavor of steel laminate coatings and thus reliance upon them as a basis for rejection of the claimed invention is proper. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 305-7063. The examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 308-1371. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.



Burton S. Mullins
Primary Examiner
Art Unit 2834

bsm
8-26-03

Notice of References Cited	Application/Control No. 09/578,228	Applicant(s)/Patent Under Reexamination HEIMANN ET AL.	
	Examiner Burton S. Mullins	Art Unit 2834	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	4-165082	06-1992	JP	n/a	C23C 22/00
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

⑩ 日本国特許庁(JP)

⑪ 特許出願公開

⑫ 公開特許公報(A) 平4-165082

⑬ Int. Cl.⁵

識別記号

庁内整理番号

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C 23 C 22/00
C 21 D 9/46
C 23 C 26/00

A 8417-4K
B 7047-4K
C 6813-4K

審査請求 未請求 請求項の数 1 (全6頁)

⑯ 発明の名称 鉄心の加工性および耐熱性の優れた方向性電磁鋼板の絶縁皮膜形成方法

⑰ 特 願 平2-290036

⑱ 出 願 平2(1990)10月27日

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明 細 書

1. 発明の名称

鉄心の加工性および耐熱性の優れた方向性電磁鋼板の絶縁皮膜形成方法

2. 特許請求の範囲

珪素鋼スラブを熱間圧延し焼鈍した後、1回或いは中間焼鈍を挟む2回以上の冷間圧延を行って最終板厚とし、この材料を脱炭焼鈍し焼鈍分離剤を塗布した後最終仕上焼鈍を施し、ついで絶縁皮膜形成用塗布剤を塗布し焼付処理した後ヒートフラットニングを施す方向性電磁鋼板の製造方法において、粒径50nm以下のコロイド状シリカからなるコロイド溶液100重量部(SiO₂として)に対し、Al, Mg, Ca, Znの硝酸塩の1種または2種以上を130~250重量部と、無水クロム酸、クロム酸塩、重クロム酸塩の1種または2種以上を10~40重量部と、Fe, Ca, Ba, Zn, Al, Ni, Sn, Cu, Cr, Cd, Nd, Mn, Mo, Si, Ti, W, Bi, Sr, Vからなる群から選ばれる元素の酸化物、炭化物、窒化物、硫化物、硼化物、水酸化物、珪酸塩、炭

酸塩、硼酸塩、硫酸塩、硝酸塩または塩化物としてその粒子径が5~2000nmの非コロイド状の固形物の1種または2種以上を0.5~25重量部とを添加してなる絶縁皮膜形成用塗布材を塗布し、焼付処理することを特徴とする鉄心の加工性および耐熱性の優れた方向性電磁鋼板の絶縁皮膜形成方法。

3. 発明の詳細な説明

(産業上の利用分野)

本発明は方向性電磁鋼板の絶縁皮膜形成方法に係わり、特に鋼板表面皮膜のすべり性と耐熱性が良好で、変圧器製造における鉄心の加工性が優れているとともに変圧器製品の磁気特性を良好ならしめる方向性電磁鋼板の絶縁皮膜形成方法に関する。

(従来の技術)

方向性電磁鋼板は、Siを例えば2~4%含有する珪素鋼スラブを熱間圧延し、焼鈍した後、1回或いは中間焼鈍を挟む2回以上の冷間圧延を施して最終板厚とし、次いで脱炭焼鈍した後、MgOを

主成分とする焼鈍分離剤を塗布し、仕上焼鈍を施してガス方位をもつ2次再結晶粒を発達させ、さらにS、N等の不純物を除去するとともにガラス皮膜を形成し、次いで絶縁皮膜用のコーティング液を塗布し、焼付処理を施して絶縁皮膜を形成して最終製品とするプロセスによって製造される。

方向性電磁鋼板は主として電気機器、トランス等の鉄心材料として使用され、磁束密度が高く鉄損が低いものであることが要請される。

一方、方向性電磁鋼板がトランスの鉄心として用いられる場合、方向性電磁鋼板のフープは連続的に巻き解かれながら剪断機で所定長さに切断された後、鉄心加工機で順次巻き重ねられて巻鉄心や積鉄心とされる。巻鉄心の場合には圧縮成型、歪取焼鈍を経てレーシングと呼ばれる巻線作業を行ってトランスとされる。

鉄心製造工程においては、例えば巻鉄心の場合、巻加工、成型作業が円滑に行え、成型後の鋼板端面やラップ部に凹凸を生ぜず、形状が優れていること、鋼板表面の潤滑性が良好であることが必要

を改善する技術が開示されている。

近年、これらの絶縁皮膜の改善によって、方向性電磁鋼板の鉄損、磁気歪、絶縁特性とともに皮膜潤滑性が改善されてきており、それなりの効果が得られている。

しかし、方向性電磁鋼板等を用いてトランス等を製造するメーカーにおいては、鉄心に加工する際の加工成型機の自動化や高速化が進み、前記改善された絶縁皮膜用コーティング剤をもってする以上に、加工上のトラブルの排除や磁気特性面で一層改善された絶縁皮膜が望まれる実情にある。

(発明が解決しようとする課題)

本発明は方向性電磁鋼板の絶縁皮膜のすべり性ならびに歪取焼鈍の際の耐熱性が良好で、鉄心加工性が優れた方向性電磁鋼板の絶縁皮膜を成形することを目的とする。

(課題を解決するための手段)

本発明の要旨とするところは、珪素鋼スラブを熱間圧延し焼鈍した後、1回或いは中間焼鈍を挟む2回以上の冷間圧延を行って最終板厚とし、こ

である。

また、歪取焼鈍時に鋼板の表面皮膜相互間で焼付がなく、レーシング作業がスムーズに行えることが、鉄心加工能率の向上或いは焼付による歪の誘起や皮膜性能の劣化を防止するという観点から重要である。これらの問題に対しては、方向性電磁鋼板の表面の絶縁皮膜の性状が大きく影響するので、歪取焼鈍時に鋼板の表面皮膜相互間で焼付がなく、レーシング作業がスムーズに行える絶縁皮膜を開発することが、加工性の観点およびトランスの磁気特性を向上せしめる上からも強く望まれている。

トランスの鉄心加工性を向上させるための手段として、絶縁皮膜形成時の塗布剤の改良がなされている。例えば特開昭61-4773号公報には、コーティング剤として第1磷酸塩に粒子径8nm以下の超微粒子コロイド状シリカ、クロム酸、クロム酸塩の1種または2種以上からなる混合液を仕上焼鈍後の鋼板に塗布し、焼付処理することにより、鋼板表面に形成する絶縁皮膜のすべり性

の材料を脱炭焼鈍し焼鈍分離剤を塗布した後最終仕上焼鈍を施し、ついで絶縁皮膜形成用塗布剤を塗布し焼付処理した後ヒートフラットニングを施す方向性電磁鋼板の製造方法において、粒径50nm以下のコロイド状シリカからなるコロイド溶液100重量部(SiO_2 として)に対し、Al、Mg、Ca、Znの磷酸塩の1種または2種以上を130~250重量部と、無水クロム酸、クロム酸塩、重クロム酸塩の1種または2種以上を10~40重量部と、Fe、Ca、Ba、Zn、Al、Ni、Sn、Cu、Cr、Cd、Nd、Mn、Mo、Si、Ti、W、Bi、Sr、Vからなる群から選ばれる元素の酸化物、炭化物、窒化物、硫化物、硼化物、水酸化物、珪酸塩、炭酸塩、硼酸塩、硫酸塩、硝酸塩または塩化物としてその粒子径が5~2000nmの非コロイド状の固形物の1種または2種以上を0.5~25重量部とを添加してなる絶縁皮膜形成用塗布材を塗布し、焼付処理することを特徴とする鉄心の加工性および耐熱性の優れた方向性電磁鋼板の絶縁皮膜形成方法にある。

以下に、本発明について詳細に説明する。

本発明者達は、前記課題を解決すべく方向性電磁鋼板の絶縁皮膜の形成について種々検討した。その結果、絶縁皮膜用コーティング剤の塗布、焼付処理過程において、コロイド状シリカ～燐酸塩～クロム化合物からなる絶縁皮膜形成用塗布剤における組成の一部として粒子径5～2000nmを有する非コロイド状物質を添加配合することにより、焼付処理により形成される絶縁皮膜の潤滑性(すべり性)が著しく向上し、さらに歪取焼鈍における、一般にスティッキングと呼ばれる皮膜の焼付現象が大幅に改善されるとともに鉄損を改善できることを見出した。

以下、実験データに基づき本発明をさらに詳細に説明する。

公知の方法で製造した方向性電磁鋼板の仕上焼鈍後のストリップコイルからサンプル切り出し、歪取焼鈍を850℃×4時間で行い、コイルセットを除去した後、2% H₂SO₄で80℃×10秒の軽酸洗を施したものをサンプルとした。このサンプルに第1表に示すように、5～2000nmの粒径

を有するSiO₂の粉末を添加配合し、よく攪拌した絶縁皮膜形成用塗布剤を、焼付処理後に4.5g/cm²となるように塗布し、N₂雰囲気中で850℃×30秒間の焼付処理を施した。

得られた製品板から試料を切り出し、第1図に示す方法(A法)で絶縁皮膜のすべり摩擦係数(FF値)を測定した。その測定方法は挟み板1-1、1-2間に試料2を置き、重錘3にて荷重Nを加え、試料2を引き出す力Aをバネ計り4で測定し、すべり摩擦係数μを、μ(FF)=A/Nより求めた。

さらに、絶縁皮膜上を一定加重を加えた鋼球を振動的にすべらせ、その際に鋼球が絶縁皮膜から受ける抵抗値を歪みゲージにより連続的に取り出す方式(B法)により皮膜表面の潤滑性を測定し、評価した。また、別に切り出した3cm×4cmの板を積層し、これを80kg/cm²の締め付け圧力で結束してN₂雰囲気中で850℃×4時間の歪取焼鈍を施し、第2図の(b)に示す引離し方法によって鋼板の剝離荷重を測定し耐スティッキング性を調査

した。結果を第1表に示す。

第1表に示すように、粒径6nmのコロイド状シリカのみで構成される従来の絶縁皮膜剤に比較して、粒子径5～2000nmの非コロイド状の固形物の粉末状酸化物を2重量部配合した本発明の絶縁皮膜形成用塗布剤を塗布し、焼付処理しものはFF値、すべり性および歪取焼鈍時の耐スティッキング性の何れも著しい向上がみられた。

第 1 表

試料	20%コロイド状シリカ 粒径 6 nm 100 cc	粉末状シリカ 5 nm 0.5 g	50 nm 0.5 g	200 nm 0.5 g	500 nm 0.5 g	2000 nm 0.5 g
1	—	—	—	—	—	—
2	—	—	—	—	—	—
3	—	—	—	—	—	—
4	—	—	—	—	—	—
5	—	—	—	—	—	—
6	—	—	—	—	—	—
50% 燐酸塩	—	—	—	—	—	—
水 6 g	—	—	—	—	—	—
FF値 (A法)	0.78	0.52	0.49	0.45	0.41	0.38
潤滑性 (B法)	×	○	○	◎	◎	◎
耐スティッキング性 (g/9 cm ²)	280	70	70	50	30	20

次に、本発明の絶縁皮膜の形成方法について述べる。

本発明における絶縁皮膜形成用塗布剤は、粒径50nm以下のコロイド状シリカからなるコロイド溶液100重量部(SiO_2 として)に対し、Al, Mg, Ca, Znの燐酸塩の1種または2種以上130~250重量部と、無水クロム酸、クロム酸塩、重クロム酸塩の1種または2種以上を10~40重量部と、Fe, Ca, Ba, Zn, Al, Ni, Sn, Cu, Cr, Cd, Nd, Mn, Mo, Si, Ti, W, Bi, Sr, Vの酸化物、炭化物、窒化物、硫化物、硼化物、水酸化物、珪酸塩、炭酸塩、硼酸塩、硫酸塩、硝酸塩または塩化物としてその粒子径が5~2000nmの非コロイド状の固形物の1種又は2種以上を0.5~25重量部とを添加してなるものであり、この絶縁皮膜形成用塗布剤を方向性電磁鋼板に塗布し、焼付処理する。

次に、本発明における諸条件の限定理由を説明する。

本発明においては、絶縁皮膜形成用塗布剤とし

なう等の問題を誘起するとともに、粒子径が粗くなることにより、逆に皮膜のすべり性も劣化してくる。

微粒子のコロイド状シリカに対し配合される粗粒子の非コロイド状固形物の粒子径は5~2000nmである。5~1000nmの範囲では絶縁皮膜溶液中で適度に凝集させることにより、また100~2000nmの範囲では均一に分散させることにより、焼付後の表面に凹凸をつけすべり性を改善する。粒子径が5nmに満たないとすべり性の改善作用はなく、一方粒子径が2000nm超では、すべり性および耐熱性はあっても、製品を積層するときに占積率の低下をもたらすので好ましくない。

次に、コロイド状シリカと燐酸塩の配合は、コロイド状シリカからなるコロイド溶液100重量部(SiO_2 として)に対し、Al, Mg, Ca, Znの燐酸塩の1種または2種以上130~250重量部が用いられる。これら燐酸塩の配合が130重量部未満ではバインダー作用が弱く、絶縁皮膜に亀裂を生じて、皮膜張力が低くなる。一方、250重

て、50nm以下の細粒のコロイド状シリカ溶液100重量部に対して、5~2000nmの粒子径を有する非コロイド状の固形物を固形分重量で0.5~25重量部添加配合するとともに、Al, Mg, Ca, Znの燐酸塩の1種または2種以上を130~250重量部、無水クロム酸、クロム酸塩、重クロム酸塩の1種または2種以上を10~40重量部加えたものを用いる。その際、非コロイド状の固形物は、その粒子径により規定される配合量を添加し、分散させるか、あるいは粒子径が小さい場合は適度に凝集させることが重要である。

50nm以下の細粒のコロイド状シリカ溶液100重量部に対して、5~2000nmの粒子径を有する非コロイド状の固形物を固形分重量で0.5~25重量部の範囲で添加配合することにより、絶縁皮膜のすべり性を著しく改善する作用がある。ベースとなる微粒子のコロイド状シリカは、50nm以下の粒子径であることが重要であり、50nm超では絶縁皮膜による鉄損、磁歪の改善効果を小さくしたり、皮膜の不透明化を生じ外観を損

量部超では皮膜の外観が劣化し、また耐熱性も劣化する。燐酸塩としては市販の50%溶液でよい。燐酸Caは溶解度が小さく50%溶液が得られないので、計算上50%溶液にバランスするように添加される。

ベース皮膜のすべり性を向上させる意味からは、最も好ましい燐酸塩の組合せは、Al-Mg-Ca, Al-Ca, Mg-Caである。

無水クロム酸、クロム酸塩、重クロム酸塩の1種または2種以上は、燐酸塩の量に応じて配合される。燐酸塩130~250重量部に対し、10重量部未満では皮膜成分中のフリー燐酸を CrPO_4 生成等の反応によって安定化させるために必要な量とならず、ベタツキ発生の原因となる。一方、40重量部を超えると、フリーのクロム酸が過剰となりこの場合もベタツキを生じる。

Fe, Ca, Ba, Zn, Al, Ni, Sn, Cu, Cr, Cd, Nd, Mn, Mo, Si, Ti, W, Bi, Sr, Vの酸化物、炭化物、窒化物、硫化物、硼化物、水酸化物、珪酸塩、炭酸塩、硼酸塩、硫酸塩、硝酸塩または塩化物の粒

子径が5~2000nmの非コロイド状の固形物が配合添加される。該固形物は皮膜表面に微細な凹凸状を形成させ、すべり性を高めるためのものであり、この作用効果を得るには粒子径が5nm以上である必要がある。一方、この粒子径が大きくなると皮膜の占積率が低下するので2000nm以下とする。

また、該非コロイド状の固形物はその量が少ないとすべり性の向上効果が得られないので、コロイド状シリカ100重量部に対して、0.5重量部以上配合する。一方、その量が多くなると皮膜の占積率が低下するので25重量部以下とする。

本発明によって製造される絶縁皮膜が、すべり性、耐熱性に優れる理由は非コロイド状の固形物の凝集体あるいは単体で鋼板表面に凹凸を形成することにあると考えられる。

第3図に絶縁皮膜形成用塗布剤組成(第1表参照)と、鋼板表面のすべり性の関係を示す。本発明の組成条件を満足しない試料No.1の絶縁皮膜形成用塗布剤を塗布したものは、第3図(a)に示す如

く数回のテストですべり性テスト不能に陥っている。添加物として50nmの非コロイド状のシリカ粉体を用いた試料No.3の絶縁皮膜形成用塗布剤では、第3図(b)に示す如く抵抗値が漸次大きくなったが良好なすべり性を示した。粗粒子として500nmの非コロイド状のシリカ粉体を用いた試料No.5の絶縁皮膜形成用塗布剤では、第3図(c)に示す如く抵抗値が経時変化することなく低い値を示しており、良好なすべり性を有する。

次に、実施例について述べる。

(実施例)

重量%でC:0.081%, Si:3.24%, Mn:0.072%, S:0.025%, sol. Al:0.027%、残部が鉄および不可避免的不純物からなる珪素鋼スラブを公知の方法で熱延し、焼鈍後冷延し、最終板厚0.220mmとした。次いで、脱炭焼鈍し、H₂Oを主成分とする焼鈍分離剤を塗布し、1200℃×20時間の仕上焼鈍しガラス皮膜を形成した。次いで、余剰の焼鈍分離剤を水洗により除去し、軽酸洗の後、第2表に示す組成からなる絶縁皮膜形成用塗

布剤を塗布した。この塗布に際して、前記塗布剤を焼付後の重量で4.5g/m²になるように鋼板に塗布し、次いで850℃×25秒間N₂雰囲気中で焼付処理を行った。

得られた鋼板からサンプルを切り出し、FF値、すべり性、腐発生有無、耐スティッキング性について調査した。結果を第3表に示す。

第 2 表

No.	20%コロイド状シリカ	非コロイド状固形物	焼 融 塩	焼 融 塩 量	備考
1	粒径 11 nm 100 ml	TiN 50 nm 0.5 g	50 % Al-Hg-Ca 50cc	7 g	*
2	"	TiN 200 nm 2 g	50 % Al-Hg-Ca 50cc	"	*
3	"	MoS ₂ 80 nm 0.5 g	50 % Al-Hg-Ca 50cc	"	*
4	"	MoS ₂ 480 nm 0.5 g	50 % Al-Hg-Ca 50cc	6 g	*
5	"	AlN 60 nm 2.5 g	50 % Al-Hg-Ca 50cc	"	*
6	"	AlN + FeS 60 nm 150 nm 2 g 0.5 g	50 % Al-Hg-Ca 50cc	"	*
7	"	MoS 30 nm 1 g	50 % Al-Zn 50cc	8 g	*
8	"	MoS 30 nm 2 g	50 % Al-Zn 50cc	"	*
9	"	MoS 30 nm 5 g	50 % Al-Zn 50cc	"	*
10	"	CaO 1500 nm 0.5 g	50 % Al-Zn 50cc	7 g	*
11	"	BN + ZrO 70 nm 100 nm 2.5 g 0.5 g	50 % Al-Zn 50cc	"	*
12	"	W ₂ C 50 nm 1 g	50 % Al-Zn 50cc	"	*
13	"	W ₂ C 50 nm 3 g	50 % Al-Zn 50cc	"	*
14	"	-	50 % Al-Hg-Ca 50cc	"	

(*印:本発明)

第 3 表

No	表面粗度 Ra (μm)	潤滑特性		鉄損 H_{17750} (W/kg)		耐スティッキング性
		FF値 (A法)	潤滑性 (B法)	処理前	処理後	
1	0.22	0.52	○	0.87	0.81	30
2	0.48	0.43	◎	0.91	0.84	0
3	0.32	0.49	○	0.90	0.83	120
4	0.54	0.46	◎	0.89	0.80	70
5	0.29	0.45	○	0.88	0.82	60
6	0.42	0.39	◎	0.89	0.81	0
7	0.18	0.41	○	0.91	0.85	80
8	0.30	0.37	○	0.90	0.82	50
9	0.57	0.33	◎	0.88	0.82	0
10	0.44	0.28	◎	0.88	0.83	0
11	0.38	0.38	◎	0.89	0.80	170
12	0.33	0.51	○	0.90	0.81	130
13	0.54	0.42	◎	0.87	0.81	50
14 比較例	0.12	0.73	×	0.91	0.86	370

(発明の効果)

本発明によれば、鋼板のすべり性および耐熱性が良好で、変圧器製造における鉄心の加工性が優れているとともに、変圧器製品の磁気特性を良好ならしめる方向性電磁鋼板を得ることができる。

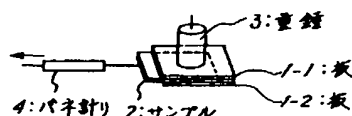
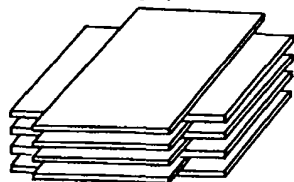
4. 図面の簡単な説明

第1図は絶縁皮膜のすべり摩擦係数を測定する手段(A法)を示す図、第2図(a)、(b)は電磁鋼板を鉄心へ加工後、歪取焼鈍するときのスティッキング性を調査する方法を示す図で、(a)歪取焼鈍におけるスティッキング性調査に際し、歪取焼鈍でのサンプルの積層状態を示す図、(b)は歪取焼鈍終了後、層間の焼付き状態を測定するときの態様を示す図、第3図(a)~(c)は絶縁皮膜形成用塗布剤組成と製品の潤滑性を示す図である。

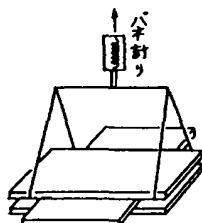
特許出願人 新日本製鐵株式 社
代 理 人 大 関 和 夫



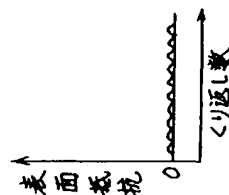
第 1 図


第 2 図
(a)


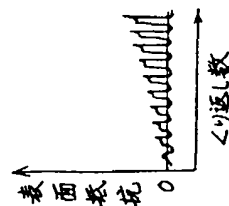
(b)



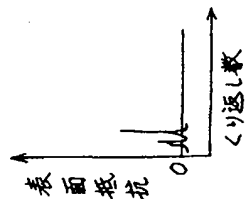
(c)



(b)



(a)



第 3 図

- (4) A claim being canceled must be listed in the claim listing with the status identifier "canceled"; the text of the claim must not be presented. Providing an instruction to cancel is optional.
- (5) Any claims added by amendment must be presented in the claim listing with the status identifier "(new)"; the text of the claim must not be underlined.
- (6) All of the claims in the claim listing must be presented in ascending numerical order. Consecutive canceled, or not entered, claims may be aggregated into one statement (e.g., Claims 1 – 5 (canceled)).

Example of listing of claims (use of the word "claim" before the claim number is optional):

Claims 1-5 (canceled)

Claim 6 (previously presented): A bucket with a handle.

Claim 7 (withdrawn): A handle comprising an elongated wire.

Claim 8 (withdrawn): The handle of claim 7 further comprising a plastic grip.

Claim 9 (currently amended): A bucket with a ~~green~~ blue handle.

Claim 10 (original): The bucket of claim 9 wherein the handle is made of wood.

Claim 11 (canceled)

Claim 12 (not entered)

Claim 13 (new): A bucket with plastic sides and bottom.

B) Amendments to the specification:

Amendments to the specification, including the abstract, must be made by presenting a replacement paragraph or section or abstract marked up to show changes made relative to the immediate prior version. An accompanying clean version is not required and should not be presented. Newly added paragraphs or sections, including a new abstract (instead of a replacement abstract), must not be underlined. A replacement or new abstract must be submitted on a separate sheet, 37 CFR 1.72. If a substitute specification is being submitted to incorporate extensive amendments, both a clean version (which will be entered) and a marked up version must be submitted as per 37 CFR 1.125.

The changes in any replacement paragraph or section, or substitute specification must be shown by underlining (for added matter) or strikethrough (for deleted matter) with 2 exceptions: (1) for deletion of five characters or fewer, double brackets may be used (e.g., [leroor]); and (2) if strikethrough cannot be easily perceived (e.g., deletion of the number "4" or certain punctuation marks), double brackets must be used (e.g., [[4]]). As an alternative to using double brackets, however, extra portions of text may be included before and after text being deleted, all in strikethrough, followed by including and underlining the extra text with the desired change (e.g., number 4 as number 14 as)

C) Amendments to drawing figures:

Drawing changes must be made by presenting replacement figures which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments, or remarks; section of the amendment, and may be accompanied by a marked-up copy of one or more of the figures being amended, with annotations. Any replacement drawing sheet must be identified in the top margin as "Replacement Sheet" and include all of the figures appearing on the immediate prior version of the sheet, even though only one figure may be amended. Any marked-up (annotated) copy showing changes must be labeled "Annotated Marked-up Drawings" and accompany the replacement sheet in the amendment (e.g., as an appendix). The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Questions regarding the submission of amendments pursuant to the revised practice set forth in this flyer should be directed to: Elizabeth Dougherty or Gena Jones, Legal Advisors, or Joe Narcavage, Senior Special Projects Examiner, Office of Patent Legal Administration, by e-mail to patentpractice@uspto.gov or by phone at (703) 305-1616.

**REVISED AMENDMENT PRACTICE: 37 CFR 1.121 CHANGED
COMPLIANCE IS MANDATORY - Effective Date: July 30, 2003**

All amendments filed on or after the effective date noted above must comply with revised 37 CFR 1.121. See Final Rule: **Changes To Implement Electronic Maintenance of Official Patent Application Records** (68 Fed. Reg. 38611 (June 30, 2003)), posted on the Office's website at: <http://www.uspto.gov/web/patents/ifw/> with related information. The amendment practice set forth in revised 37 CFR 1.121, and described below, replaces the voluntary revised amendment format available to applicants since February 2003. **NOTE: STRICT COMPLIANCE WITH THE REVISED 37 CFR 1.121 IS REQUIRED AS OF THE EFFECTIVE DATE (July 30, 2003).** The Office will notify applicants of amendments that are not accepted because they do not comply with revised 37 CFR 1.121 via a Notice of Non-Compliant Amendment. See MPEP 714.03 (Rev. 1, Feb. 2003). The non-compliant section(s) will have to be corrected and the entire corrected section(s) resubmitted within a set period.

Bold underlined italic font has been used below to highlight the major differences between the revised 37 CFR 1.121 and the voluntary revised amendment format that applicants could use since February, 2003.

Note: The amendment practice for reissues and reexamination proceedings, except for drawings, has not changed.

REVISED AMENDMENT PRACTICE

I. Begin each section of an amendment document on a separate sheet:

Each section of an amendment document (e.g., Specification Amendments, Claim Amendments, Drawing Amendments, and Remarks) must begin on a separate sheet. Starting each separate section on a new page will facilitate the process of separately indexing and scanning each section of an amendment document for placement in an image file wrapper.

II. Two versions of amended part(s) no longer required:

37 CFR 1.121 has been revised to **no longer require** two versions (a clean version and a marked up version) of each replacement paragraph or section, or amended claim. Note, however, the requirements for a clean version and a marked up version for **substitute specifications** under 37 CFR 1.125 have been retained.

A) Amendments to the claims:

Each amendment document that includes a change to an existing claim, cancellation of a claim or submission of a new claim, **must include a complete listing** of all claims in the application. After each claim number in the listing, the status must be indicated in a parenthetical expression, and **the text of each pending claim** (with markings to show **current** changes) must be presented. The claims in the listing will replace all prior claims in the application.

- (1) The current status of all of the claims in the application, including any previously canceled, not entered or withdrawn claims, must be given in a parenthetical expression following the claim number using only one of the following seven status identifiers: (original), (currently amended), (canceled), (withdrawn), (new), **(previously presented)** and **(not entered)**. The text of all pending claims, **including withdrawn claims**, must be submitted each time any claim is amended. Canceled **and not entered** claims must be indicated by only the claim number and status, without presenting the text of the claims.
- (2) The text of all claims **being currently amended** must be presented in the claim listing with markings to indicate the changes that have been made relative to the immediate prior version. The changes in any amended claim must be shown by underlining (for added matter) or strikethrough (for deleted matter) with 2 exceptions: (1) for **deletion of five characters or fewer, double brackets may be used (e.g., [[eroor]])**; and (2) if **strikethrough cannot be easily perceived (e.g., deletion of the number "4" or certain punctuation marks), double brackets must be used (e.g., [[4]])**. As an alternative to using double brackets, however, **extra portions of text may be included before and after text being deleted, all in strikethrough, followed by including and underlining the extra text with the desired change (e.g., number 4 as number 14 as)**. An accompanying clean version is not required and should not be presented. Only claims of the status "currently amended," and "withdrawn" that are being amended, may include markings.
- (3) The text of pending claims **not being currently amended, including withdrawn claims**, must be presented in the claim listing in clean version, i.e., without any markings. Any claim text presented in clean version will constitute an assertion that it has not been changed relative to the immediate prior version except to omit markings that may have been present in the immediate prior version of the claims.

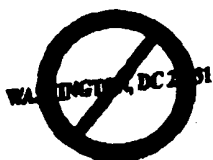
The United States Patent and Trademark Office has changed certain mailing addresses!

Effective May 1, 2003

Use the address provided in this flyer after May 1, 2003 for any correspondence with the United States Patent and Trademark Office (USPTO) in patent-related matters to organizations reporting to the Commissioner for Patents.

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Also effective May 1, 2003, the USPTO is changing the special Box designations for Patents and Trademarks to corresponding Mail Stop designations (e.g., "Box 4" will now be "Mail Stop 4").

For further information, see *Correspondence with the United States Patent and Trademark Office*, 68 Fed. Reg. 14332 (March 25, 2003). A copy of the *Federal Register* notice is available on the USPTO's web site at <http://www.uspto.gov/web/menu/current.html#register>

A listing of specific USPTO mailing addresses (See Patents – specific) will be available on the USPTO's web site on April 15, 2003 at <http://www.uspto.gov/main/contacts.htm>

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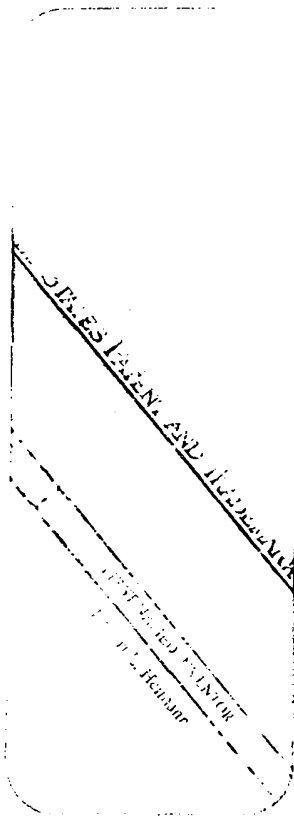
Questions regarding the content of this flyer should be directed to the Inventor Assistance Center at (703) 308-4357 or toll-free at 1-800-786-9199.

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